Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number | Candidate Number

Pearson Edexcel Level 3 GCE

Wednesday 5 June 2024

Morning (Time: 2 hours 15 minutes plus 10 minutes setting up time)

Paper reference **9MT0/41**

Music Technology

Advanced

COMPONENT 4: Producing and Analysing

You must have: Figure 1 for Question 6 (enclosed), Pearson audio/MIDI files, headphones or monitor speakers, digital audio workstation (DAW) and MIDI keyboard.

Total Marks

Setting up time

- Open a new project in your DAW using 16 bit/44.1 kHz sample rate.
- Save the project as **'comp4_your candidate number' (e.g. comp4_1234)** in the folder designated by your centre.
- Set the metronome to **170 bpm.**
- Import 'rhythm guitar.wav' to a new track in your DAW, aligned with the beginning of bar 1.
- Ensure that the guitar is audible and plays in time with the metronome. The guitar begins bar 2, beat 1.
- You must not open the paper until instructed to do so by the invigilator.

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- Save your audio files for Questions 1, 2, 4 and 5 within the 2 hours 15 minutes examination time.
- You must ensure that the left and right earpieces of your headphones are worn correctly.
- Access to a calculator or calculator software is not permitted.
- Access to the internet or local network is not permitted.

Information

- The total mark for this paper is 105.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

P75872A

©2024 Pearson Education Ltd.

F:1/1/1/1/1

P 7 5 8 7 2 A 0 1 2 4

Pearson

SECTION A

Answer ALL questions. Write your answers in the spaces provided.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Question 1 is about the drum part.

1 Import the MIDI file 'drums.mid' to a new track in your DAW. Align the part so that the drums begin playing at the start of bar 10.

(a) There are many different note velocity values used in the MIDI file.

(i) State the reason that the drum programmer chose to have notes with different velocity.

(1)

.....

.....

(ii) Complete the table below to give the velocity in decimal and in binary of the highest velocity value in the MIDI file.

Velocity in decimal	Velocity in binary
(1)	**(1)**

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(b) Some sequencers display the range of values of pitch bend as 0–16383. 0 is full downward bend and 16383 is full upward bend.

(i) State how many bytes MIDI uses to represent the range of values of pitch bend.

(1)

.....

(ii) Identify the value of pitch bend when it is at its centre position.

(1)

☒ **A** 1

☒ **B** 127

☒ **C** 8192

☒ **D** 32768

(iii) Identify how MIDI would transmit the value of 16383.

(1)

	LSB	MSB
☒ **A**	0000 0000	0000 0000
☒ **B**	0111 1111	0000 0000
☒ **C**	0000 0000	0111 1111
☒ **D**	0111 1111	0111 1111

DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA

(c) Import 'drums example.wav' to a new track in your DAW. The file illustrates how bars 32–35 of the drums should sound. You should not use this audio in your final mix.

The notes in the MIDI file have been assigned to the incorrect sounds. Assign the notes to the sounds listed below to form the drum part. You must not change the rhythm.

- Kick drum
- Snare
- Open hi-hat
- Ride cymbal bell
- Rack tom
- Floor tom
- Two different crash cymbals

(8)

Bounce/export the completed drum part as a single 16 bit/44.1 kHz stereo .wav file to the designated folder on your computer.

Name it 'q1_ your candidate number' (e.g. q1_1234).

(Total for Question 1 = 14 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

BLANK PAGE

Question 2 is about the electric guitar parts.

2 Listen to the rhythm electric guitar part you have already imported.

(a) A noise gate has been applied to the electric guitar. Identify which **one** of the following best describes the action of a noise gate.

(1)

- ☒ **A** The gate cuts all sound above the threshold.
- ☒ **B** The gate cuts all sound below the threshold.
- ☒ **C** The gate cuts frequencies below the threshold.
- ☒ **D** The gate cuts low velocities.

(b) Identify the unit used to measure the threshold value.

(1)

- ☒ **A** dB
- ☒ **B** Hz
- ☒ **C** ms
- ☒ **D** V

(c) Identify the unit used to measure the attack value.

(1)

- ☒ **A** dB
- ☒ **B** Hz
- ☒ **C** ms
- ☒ **D** V

(d) Describe why it is important to apply a noise gate to this style of electric guitar.

(2)

.....

.....

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

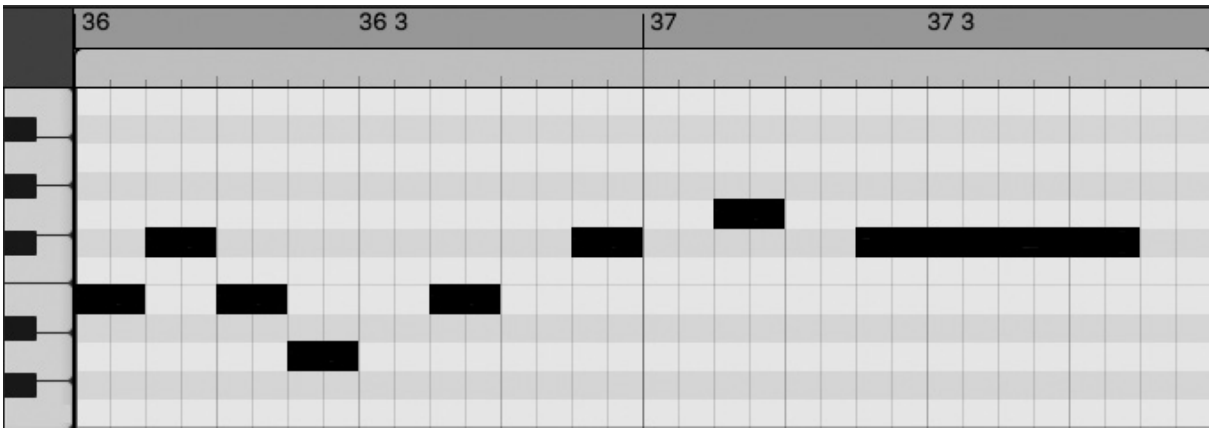
(e) Import 'lead guitar incomplete.wav' into your DAW. This is the incomplete lead guitar part. The beginning of this audio track should be aligned with the start of bar 9. The lead guitar begins at the start of bar 10.

Complete the lead guitar part.

- Use audio from 'lead guitar incomplete.wav'.
- Remove noise from bar 9.
- Bars 26–33 must be copied from bars 18–25.
- Bars 34–41 must be copied from bars 10–17.
- Bars 42–49 must also be copied from bars 10–17.
- Bars 50–57 must also be copied from bars 10–17.
- The lead guitar must not have any clicks or glitches.

(4)

(f) In bars 36 and 44, two of the pitches are incorrect in the lead guitar recording. The diagram below shows the correct pitches of bars 36–37.



Correct the lead guitar pitches.

- The pitches must match the diagram in bar 36.
- Bar 44 must have the same pitches as bar 36.

(5)

Bounce/export the completed lead guitar part as a single 16 bit/44.1 kHz stereo .wav file to the designated folder on your computer.

Name it 'q2_ your candidate number' (e.g. q2_1234).

(Total for Question 2 = 14 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Question 3 is about the bass part.

3 Import 'bass.wav' to a new track in your DAW. The beginning of this audio track should be aligned with the start of bar 1. The bass begins at the start of bar 2.

(a) An HPF has been added to the bass in bars 2–9.

(i) The filter is 48 dB/octave. Explain what 48 dB/octave refers to.

(2)

.....

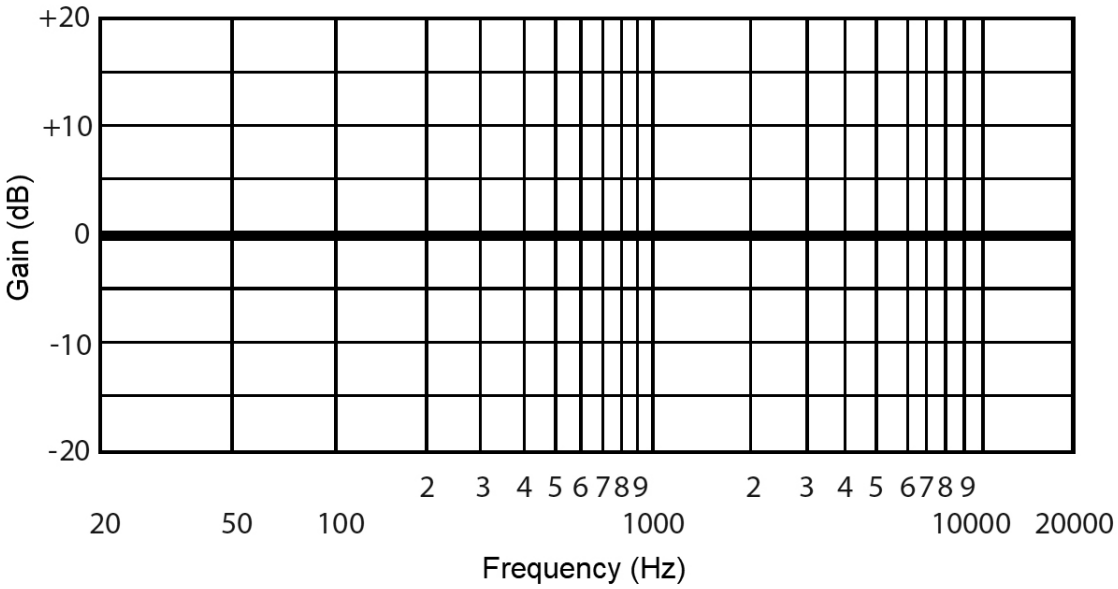
.....

.....

.....

(ii) On the graph below, draw the HPF.

(3)



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(b) An audio file has a file size of 10 MB and has the following properties:

- .wav
- mono
- sample rate 44.1 kHz
- 16 bit.

(i) Calculate the file size of the audio file if it were converted to stereo.

(1)

..... MB

(ii) Calculate the file size of the audio file if it were converted to have the following properties:

- .wav
- stereo
- sample rate 88.2 kHz
- 24 bit.

(1)

..... MB

DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA

(c) Distortion has been applied to the bass with the settings below.

The output level has been reduced so that the peak level of the distorted signal is identical to the peak level of the original clean signal. Identify which **one** of these statements best describes the RMS level.

(1)

☒ **A** Adjusting the output level makes no difference to the RMS level of the distorted signal.

☒ **B** Both clean and distorted signals have the same RMS level.

☒ **C** The RMS level of the distorted signal is higher than the original clean signal.

☒ **D** The RMS level of the distorted signal is lower than the original clean signal.

(Total for Question 3 = 8 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

BLANK PAGE

Question 4 is about the vocal part.

4 Import 'vocal.wav' to a new track in your DAW. This track is the vocal. Ensure that the beginning of this audio track is aligned with the start of bar 1. The vocal begins bar 6, beat 1.

(a) On the graph below:

- Draw a square wave.

(1)

- Label the axes.

(2)

- Label the amplitude of the wave.

(1)

- Label the period of the wave.

(1)

(b) On the graph below, draw the same wave with the polarity inverted.

(1)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

(c) Describe what would happen if the waveforms from parts (a) and (b) were added together.

(1)

.....

.....

(d) Describe a situation where it is important to check the polarity of recorded signals.

(2)

.....

.....

.....

(e) There is some intrusive background noise in bar 44. Use 'noise.wav' to remove the unwanted background noise from the vocal track so that only the singing can be heard.

(4)

Bounce/export the completed vocal part as a single 16 bit/44.1 kHz stereo .wav file to the designated folder on your computer.

Name it 'q4_ your candidate number' (e.g. q4_1234).

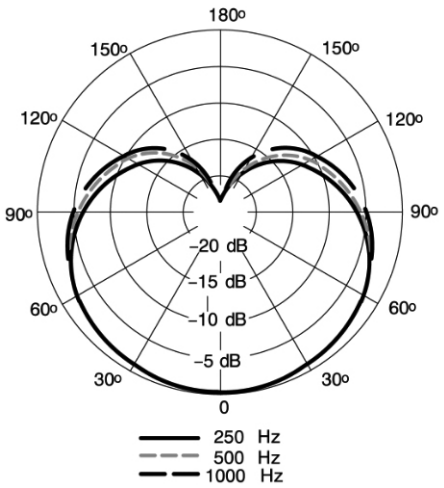
DO NOT WRITE IN THIS AREA

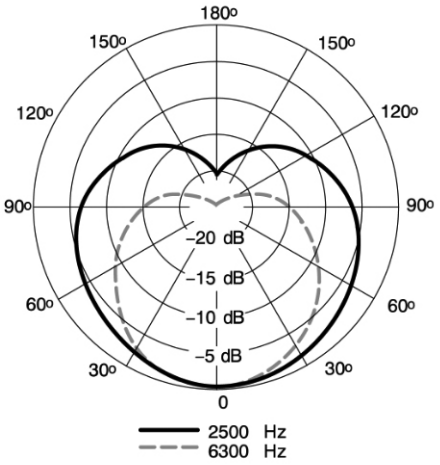
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(f) This vocal was recorded using a Shure SM7B. The graphs below show how polar response changes according to frequency. Analyse how the polar response of this microphone changes according to frequency and the implications when recording a vocal.

(4)





DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

BLANK PAGE

(g) The pictures below show a pair of nearfield studio monitors and a mobile phone internal speaker (circled). Evaluate the suitability of each of these to monitor this song during mixing.

(8)

Nearfield studio monitors

Mobile phone

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(Total for Question 4 = 25 marks)

5 You should now have the following tracks in your DAW: rhythm guitar, lead guitar, drums, bass, and vocal.

(a) Remove the noise at the end of the bass track.

(1)

(b) Apply a filter to the rhythm guitar in bars 2–9. The filter characteristics should match the bass guitar filtering in bars 2–9.

(3)

(c) Apply double tracking to the rhythm guitar throughout.
- Pan each rhythm guitar part hard left and hard right.

(3)

(d) The vocal in bars 34–49 is already compressed. Compress the vocal in bars 6–31.
- Ensure that all parts of the vocal can be heard above the other parts.
- Ensure that the vocal does not get buried or jump out of the mix.
- The delay in bar 31 should not be compressed.

(3)

(e) Gate the lead guitar.
- Import 'gate tone.wav' to a new track in your DAW. The beginning of this audio track should be aligned with the start of bar 34. You should not hear this audio in your final mix.
- 'gate tone.wav' should trigger the side chain of the gate so that the lead guitar is silent when 'gate tone.wav' is silent.
- Only bars 34–49 should be affected.

(3)

(f) Listen to the delay on the word "everything" in bar 31. Recreate the same delay on the word "abyss" in bar 7 to fill the gap before the drums enter in bar 10.

(5)

(g) Balance the levels of the mix.

(3)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

(h) Produce a final stereo mix.

- Ensure that the mix output is at as high a level as possible.
- It should be free from distortion.
- Do not limit or compress the mix output.
- Ensure that the beginning and the end of the music are not cut off.
- Ensure that silences at the beginning and at the end do not exceed one second.

(3)

Bounce/export the completed mix as a single 16 bit/44.1 kHz stereo .wav file to the designated folder on your computer.

Name it 'q5_ your candidate number' (e.g. q5_1234).

(Total for Question 5 = 24 marks)

TOTAL FOR SECTION A = 85 MARKS

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

SECTION B

Answer Question 6. Write your answer in the space provided.

6 Figure 1 shows a monophonic synthesiser from 1982. Evaluate the suitability of the settings to produce a synth bass.

(20)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(Total for Question 6 = 20 marks)

TOTAL FOR SECTION B = 20 MARKS
TOTAL FOR PAPER = 105 MARKS

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

BLANK PAGE

BLANK PAGE

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Pearson Edexcel Level 3 GCE

Wednesday 5 June 2024

Morning (Time: 2 hours 15 minutes plus 10 minutes setting up time)

Paper reference **9MT0/41**

Music Technology

Advanced

COMPONENT 4: Producing and Analysing

Figure 1 for Question 6

Do not return Figure 1 with the question paper.

Turn over ▶

P75872A

©2024 Pearson Education Ltd.

F:1/1/1/1/1/1

P 7 5 8 7 2 A

Pearson

MODULATOR
VCO
SOURCE M
TUNE
LFO/CLK
RATE
WAVE FORM
RANDOM
NOISE
MOD
RANGE
16'
8'
4'
2'
PULSE WIDTH
LFO
MAN
ENV
SUB OSC
POWER
VOLUME
PORTAMENTO
LFO
VCO
VCF
MOD
AUTO OFF ON
PORTAMENTO
L M H
TRANSPOSE
BENDER
BENDER

Figu

IXER
VCF
VCA
ENV
NOISE
FREQ
RES
ENV
MOD
KYBD
A
D
S
R
1OCT DOWN
2OCT DOWN
2OCT DOWN
ENV
GATE
Roland
SH-101

ure 1

BLANK PAGE